What Is Claimed Is:

1. An apparatus for providing dynamic bandwidth control to a broadcast optical communications network, comprising:

a network element to communicate downstream to users, comprising:

a demultiplexer to separate a received optical communications signal, carrying a mixture of broadcast and targeted communications services for users, into a plurality of wavelengths;

a plurality of splitters, each splitter to receive one of said plurality of wavelengths as an input signal, and to split said input signal into a plurality of output signals;

at least one optical cross-connect switch to receive said plurality of output signals from said splitters, and to connect each output signal to a pre-determined output port; and

a plurality of combiners, each combiner having at least one more input signal than the number of output signals for each said splitter wherein the at least one more input signal carries at least one control channel, operating on a control wavelength, to control selection of the pre-determined output ports by the switch, and each combiner to receive, combine, and output a plurality of said output signals from said switch.

2. The apparatus of claim 1, further comprising:

at least one amplifier to amplify said received optical communications signal and output the amplified signal to said demultiplexer.

3. The apparatus of claim 1, further comprising:

at least one auxiliary input port to input at least one additional optical communications signal into said switch; and

at least one auxiliary output port to output said additional signal from said switch.

4. The apparatus of claim 3, wherein said additional optical communications signal is input from an alternate communications network.

5. The apparatus of claim 4, wherein said alternate communications

network is a wireless communications network.

6. The apparatus of claim 5, wherein said additional signal to communicate between a base station and a mobile telephone switching office in the wireless communications network via connection to a plurality of other auxiliary input and output ports on a plurality of other optical switches.

7. The apparatus of claim 3, wherein said additional optical communications signal is an additional wavelength signal input into said switch as determined by said control channel.

8. The apparatus of claim 7, further comprising:

an optical transponder to convert an existing wavelength, one of said plurality of wavelengths output by said demultiplexer, into said additional wavelength.

9. The apparatus of claim 1, further comprising:

a switch controller to monitor said switch including the ports, and to receive and process information carried by said control channel, said control channel being carried by said received optical communications signal, and to output said control channel into said optical switch; and

wherein the input of said control channel into said switch to initiate switching, for a pre-determined interval, of the splitter output signals to said pre-determined output ports as selected by the control wavelength.

10. The apparatus of claim 1, further comprising:

a network element to communicate upstream within an optical communications network, comprising:

a plurality of demultiplexers, each demultiplexer to separate a plurality of received optical communications signals into a plurality of output wavelengths;

at least one optical cross-connect switch to receive said plurality of output wavelengths from said plurality of demultiplexers, and to connect each output wavelength to a pre-determined output port; and

at least one combiner having at least one more input signal than the total number of output wavelengths for each said demultiplexer wherein the at least one more input signal carries at least one control channel, operating on a control wavelength, to control selection of the pre-determined output ports by the switch, and the at least one combiner to receive and combine a plurality of said output wavelengths from said switch, and to output said combined signal carrying said output wavelengths.

11. The apparatus of claim 10, further comprising:

a switch controller, interconnected to the upstream network element, to monitor said switch including the ports, and to receive and process information carried by said at least one control channel, said at least one control channel being carried by each received optical communications signal, and to output said at least one control channel into said optical switch; and

wherein the input of said at least one control channel into said switch to initiate switching, for a pre-determined interval, of the plurality of demultiplexers output wavelengths to said pre-determined output ports as selected by the control channel.

12. The apparatus of claim 1, wherein said plurality of wavelengths carry a mixture of broadcast and targeted communications services for business and residential users, and said plurality of wavelengths are shared by said residential and business users, as controlled by the control channel, for independent, pre-determined intervals.

13. The apparatus of claim 12, wherein said communications services targeted for the business users includes ethernet and internet communications services.

14. An apparatus for providing dynamic bandwidth control to a broadcast optical communications network, comprising:

a network element for communicating downstream to users:

a demultiplexer to separate a received optical communications signal into a plurality of wavelengths;

a plurality of splitters, each splitter to receive one of said plurality of wavelengths as an input signal, and to split said input signal into a plurality of output signals;

at least one optical cross-connect switch to receive said plurality of output signals from said splitters, and to connect each output signal to a pre-determined output port;

a plurality of combiners, each combiner having at least one more input signal than the number of output signals for each said splitter wherein the at least one more input signal carries at least one control channel, operating on a control wavelength, and each combiner to receive and combine a plurality of said output signals from said switch, and to output said combined signals; and

a switch controller to monitor said switch including the ports, and to receive and process information carried by said control channel, said control channel being carried by said received optical communications signal, and to output said control channel into each said combiner.

15. A control system to provide dynamic bandwidth control to a broadcast optical communications network, comprising:

a system software module to control and monitor a network element, the network element comprising:

a demultiplexer to separate a received optical communications signal, carrying a mixture of broadcast and targeted communications services for users, into a plurality of wavelengths;

a plurality of splitters, each splitter to receive one of said plurality of wavelengths as an input signal, and to split said input signal into a plurality of output signals;

at least one optical cross-connect switch to receive said plurality of output signals from said splitters, and to connect each output signal to a pre-determined output port; and

a plurality of combiners, each combiner having at least one more input signal than the number of output signals for each said splitter wherein the at least one more input signal carries at least one control channel, operating on a control wavelength, to control selection of the pre-determined output ports by the switch, and each combiner to receive, combine, and output a plurality of said output signals from said switch.

16. The control system of claim 15, wherein said system software module includes a processor to perform one of receiving at least one command over said control channel and executing said at least one command, and generating a message to send over said control channel.

17. The control system of claim 16, wherein said processor to execute said at least one command by enabling or disabling a portion of the network element based on said at least one command and providing a feedback response on the execution of said at least one command, the response including the condition of the network element portion.

18. The control system of claim 16, wherein said processor to execute one of at least one direct, broadcast, and chained command; and

wherein a direct command being received based on an internet protocol address for the network element, a broadcast command being received as a command sent to a plurality of network elements, and a chained command being received as a command sent to successive network elements, one after the other, as the received chained command is executed at each current network element.

19. The control system of claim 16, wherein said processor to generate a message at pre-determined intervals, the message carrying information about the current condition of the network element.

20. The control system of claim 15, further comprising:

an element management system programmable to interface with at least one system software module over the control channel including providing a graphical user interface to receive user requests and to translate the user requests into at least one command to send the system software module, and to receive a response from the system software module verifying the completion of the at least one command sent to the module.

21. The control system of claim 20, wherein said element management system being programmable to monitor communications traffic on the network element ports using traffic data requested from and sent by said system software module, and to generate alarms or reconfigure the network element to change traffic loads on the ports based on said traffic data.

22. The control system of claim 20, wherein said element management system being programmable to generate pre-determined statistical information about communications traffic input and output on pre-determined ports of the network element.

23. The control system of claim 15, further comprising:

a network management system programmable to interface with at least one element management system over the control channel; and

wherein the network management system including a services enabling module to provide targeted communications services to users, and including a network state machine that includes a network state table to provide information about the current state of the optical communications network.

24. The control system of claim 23, wherein said services enabling module including a user interface module to provide and display a network map showing the positions of a plurality of network elements in the communications network, and to allow a user to select a target area of at least one network element for targeted communications services where at least one selected wavelength to be sent to the target area.

25. The control system of claim 24, wherein said services enabling module programmable to send commands, using said system software module,

to the at least one network element to connect the selected wavelength as an input wavelength to a selected at least one output port of the targeted network element.

26. The control system of claim 25, wherein said commands include a command to connect a returning wavelength from the at least one output port to an input port of the targeted network element to allow upstream communications services, and wherein said network state table is updated upon the network management system receiving confirmation of the command execution.

27. The control system of claim 23, wherein said network state machine being programmable to locate all network elements in the optical communications network and to generate a network state map including all network elements based on receiving messages, in response to queries from the network management system, from at least one system software module over the control channel.

28. The control system of claim 23, wherein said network state machine being further programmable to update the network state map based on updated messages being received from the at least one system software module.

29. The control system of claim 23, wherein said services enabling module programmable to send at least one command, using said system software module, to the at least one network element to connect an additional wavelength as an input wavelength to a selected at least one output port of the targeted network element, and to setup a routing path for said additional wavelength through a plurality of additional network elements to a selected endpoint, as selected by said network management system.

30. The control system of claim 29, wherein said network state table is updated, to indicate that said routing path has been established, upon the network management system receiving confirmation of the command execution.

31. A method to provide dynamic bandwidth control to a broadcast optical communications network, comprising:

receiving and separating an optical communications signal into a plurality of wavelength signals;

splitting each wavelength signal into a plurality of splitted input signals;

connecting each input signal to a pre-determined output port to generate an output signal; and

combining pre-determined groups of output signals together to generate a plurality of grouped output signals, where the grouped output signals each include at least one more output signal than splitted input signal wherein the at least one more output signal carries at least one control channel, operating on a control wavelength, to control connecting of the splitted input signals to the output ports.

32. The method of claim 1, wherein said optical communications signal only carries audio signals.

33. The method of claim 1, wherein said optical communications signal only carries video signals.

34. A method of providing dynamic bandwidth control to a broadcast optical communications network, comprising:

receiving an optical communications signal carrying broadcast communications services for users; and

scheduling a portion of the broadcast communications services to be delivered as separate, targeted communications services to a pre-determined group of users.

35. The method of claim 34 wherein said targeted communications services share at least one common wavelength with the broadcast communications services.

36. The method of claim 35 wherein said scheduling occurs at a pre-determined periodic time of the day.

37. The method of claim 36 wherein said users of the broadcast communications services are business users, and the users of the targeted communications services are residential users.